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NOTES FOR STUDENTS.

Mosaic disease of tobacco.—In an extensive account of the mosaic disease of tobacco, which he has been investigating for a number of years, HUNGER[6] deals somewhat radically with the theories that have been advanced to account for the disease, and gives, as he believes, a new explanation. The earlier bacterial theories of MAYER, PRILLIEUX, DELACROIX, and others are treated only as matters of historical interest, since they are based on insufficient evidence. The more recent work of IWANOWSKI receives a more extended notice, although his view of the bacterial nature of the disease is likewise refuted, as HUNGER has been unable in his own investigations to corroborate IWANOWSKI'S work. BEIJERINCK'S theory that the disease is caused by an active fluid substance, itself capable of growth, is discredited on the ground that BEIJERINCK was unable to show that the virus was able to increase in quantity outside of the plant, and that his proof of the fluid nature of the virus (diffusion in agar) is not sufficient. Against the enzyme theory of WOODS the author raises two principal objections: (1) the transferability of the disease without limit does not accord with the properties of enzymes, whose activity is diminished by extreme dilution; (2) the virus of the mosaic disease has the property of being able to diffuse through parchment, a property not possessed by enzymes.

HUNGER advances the view that the mosaic disease is due exclusively to disturbances of metabolism, the outward manifestation of which is the peculiar form of variegation seen in the leaves. That the mosaic disease, to whatever cause it may be attributed, is a result of disturbances of the metabolic processes of the plant is beyond cavil; how this statement brings us any nearer to an explanation of the ultimate cause of the disease is beyond our comprehension. The author regards the disease as a sort of latent property possessed by tobacco plants, in which it may develop spontaneously if conditions are favorable, or to which it may be communicated by grafting and other methods. It is to be regarded as a kind of communicable variability! The active cause of the disease he regards as a toxin normally produced in the plant, but not injurious except under special conditions, when it accumulates in excess of the normal amount. The toxin is not like BEIJERINCK'S substance, capable of active growth, but is capable, when entering into a normal cell, of producing there catalytic effects, in consequence of which the toxin is there regenerated secondarily. In the words of the author, it is physiologically autocatalytic, all of which is perhaps merely a more extended theoretical explanation of what is ordinarily termed growth. HUNGER discusses also the etiology of the disease, and the probable relation of the methods of selection of tobacco practised at Deli to the rapid increase of the disease in the Sumatra tobacco districts. He points out that in order to obtain a high grade wrapper-leaf it has for generations been the practice of the tobacco growers to select for seed the plants with the thinnest leaves. This selection has resulted in a race of plants degenerate from the standpoint of their power to resist unfavorable conditions. In the fields, even under usual conditions, a large percentage of the plants wilt on hot days. The reduction of thickness of the leaf is held in large measure responsible for the occurrence of the mosaic disease. A lesser though important influence is also attributed to the direct action of the soils.—H. HASSELBRING.

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[6] HUNGER, F. W. T., Untersuchungen und Betrachtungen über die Mosaik-Krankheit der Tabakspflanze. Zeitschr. Pflanzenkr. **15**:257–311. 1905.

Microsporangia of Pteridosperms.—In 1905 KIDSTON published a preliminary note on the occurrence of microsporangia in connection with the foliage of Lyginodendron.[7] He has now published the full paper,[8] with detailed discussion and illustration. He first elaborates the evidence that *Sphenopteris Höninghausi* Brongn. and *Lyginodendron Oldhamium* Williamson are identical plants, and of course *Crossotheca Höninghausi* is the fertile pinnule of the former. It follows that the sporangia found on this species of Crossotheca are the microsporangia of *Lyginodendron Oldhamium*, a well-known pteridosperm. This rules out Miss BENSON'S claim that *Telangium Scotti* represents the microsporangia of this Lyginodendron.

The microsporangia are borne on modified pinnae, associated with sterile pinnae. The fertile pinna is oval, entire, on a short thick pedicel, and on the under side of the blade six to eight fusiform bilocular sporangia are borne, which bend inward at an early stage so that their pointed apices meet, forming a sort of hemispherical sorus. Later they spread apart and appear as a fringe hanging from the margin of the pinnule. In all cases the microspores are present, but no internal structure seems to be evident. The genus Crossotheca contains eight species, a new one being described in this paper, and perhaps it is safe to assume that all of them belong to the pteridosperms.

In a general discussion of the occurrence of fern-like plants, KIDSTON comes to the conclusion that the pteridosperms (including all Cycadofilices) are undoubtedly the oldest group of fern-like plants of which we have evidence, being plainly represented in the upper Devonian; that in the Lower Carboniferous pteridosperms were still dominant, true ferns being feebly represented, if at all, by the Botryopterideae; that in the Upper Carboniferous the same relative representation continued. It seems highly improbable, therefore, that the pteridosperms could have descended from true ferns, and KIDSTON is inclined to believe that there is no more relationship between the two groups than that of a common ancestry for pteridosperms and eusporangiate ferns. In summing up his conception of the most probable lines of descent of the existing ferns and cycads, he indicates three lines: an independent one, leading from Botryopterideae (of unknown origin) to the leptosporangiate ferns, and two lines converging in common but unknown ancestral forms, one leading to the Marattiaceae, the other through pteridosperms to the cycads.—J. M. C.

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[7] BOT. GAZETTE **41**:219. 1906.

[8] KIDSTON, ROBERT, On the microsporangia of the Pteridospermae, with remarks on their relationships to existing groups. Phil. Trans. Roy. Soc. London B. **198**:413–445. *pls. 25–28.* 1906.